

Application No. 10/087,256  
Amendment "C" dated October 20, 2005  
Reply to Office Action mailed July 8, 2005

### REMARKS

Claims 1 and 5-28 are pending in the application, wherein claims 1, 5-7, 20, 22-26 and 28 have been amended and claims 3 and 4 have been cancelled.

The independent claims are all drawn to the elected invention of group I (*i.e.*, a two-component composition comprising a stiff thermoplastic biodegradable polymer and a soft thermoplastic biodegradable polymer). Upon the allowance of the generic independent claims, Applicants respectfully request reconsideration and rejoinder of all nonelected dependent claims.

The Office Action rejects claims 1, 3, 7-12, 14, 19, 25 and 26 under 35 U.S.C. § 112, 2nd paragraph, as being indefinite for the reasons set forth in the Office Action at pages 2 and 3. In response, Applicants have amended the claims to address the concerns raised in the Office Action. Accordingly, Applicants request reconsideration and withdrawal of this rejection.

The Office Action rejects claims 1, 3, 7-12, 14-23, 25 and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,096,809 to Loreks et al. in view of U.S. Patent No. 5,817,721 to Warzelhan et al. The Office Action also rejects claims 1-3, 7-12, 14-23, 25 and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,806,353 to Zhang et al. in view of Warzelhan et al. In response, Applicants have amended the claims in order to distinguish over the applied art.

Claim 1 was amended to specify that the at least one soft synthetic thermoplastic biodegradable polymer comprises an aliphatic-aromatic copolyester. As set forth in the Application at page 26, lines 14-16, Ecoflex is an aliphatic-aromatic copolyester that is an example of a soft synthetic thermoplastic biodegradable polymer. Claim 1 was further amended to add polylactic acid as an example of a stiff synthetic thermoplastic biodegradable polymer. Application, page 23, lines 1-2. Finally, claim 1 was further amended to specify that "the biodegradable composition optionally includes, in addition to the at least one soft synthetic thermoplastic biodegradable polymer and the at least one stiff synthetic thermoplastic biodegradable polymer, a natural polymer portion consisting essentially of thermoplastic starch that is substantially free of high boiling liquid plasticizers". Support for this limitation is found at page 9, lines 12-16 and page 40, lines 18-21 of the Application. As discussed therein, high boiling liquid plasticizers such as glycerine, propylene glycol and the like, when used in the manufacture of wraps intended to come into contact with food products, can potentially diffuse

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into food. For this reason, it is preferable to utilize thermoplastic starch polymers that are made without the use of such high boiling liquid plasticizers.

The use of thermoplastic starch that is substantially free of high boiling liquid plasticizers, if included at all, clearly distinguishes over Lorcks et al., as Lorcks et al. only discloses thermoplastic starch compositions made using high boiling liquid plasticizers such as glycerol or sorbitol. Col. 1, line 66 – col. 2, line 6; col. 7, Tables 1 and 2, footnote 2; col. 9, Table 3, footnote 2; col. 11, Table 4, footnote 2. Footnote 2 beneath each of Tables 1–4 teaches the following: “TPS = thermoplastic starch = starch + sorbitol + glycerol ...”. Although claim 1 does not require thermoplastic starch, to the extent that it is included at all, it “is substantially free of high boiling liquid plasticizers”. In contrast, every composition manufactured according to Lorcks et al. includes thermoplastic starch made using high boiling liquid plasticizers such as glycerol and sorbitol. Because Warzelhan et al. neither teaches nor suggests anything with respect to thermoplastic starch, Applicants submit that claim 1 as amended is unobvious over the combination of Lorcks et al. and Warzelhan et al.

Zhang et al. is directed to “a biodegradable plant protein composite” (Abstract) that necessarily includes protein as a critical component of the disclosed compositions. As acknowledged in the Office Action, the plant protein comprises 5 to 90 parts by weight of the composition of Zhang et al. Claim 1 was amended to state that “the biodegradable composition optionally includes ... a natural polymer portion consisting essentially of thermoplastic starch that is substantially free of high boiling liquid plasticizers”. Zhang et al. neither teaches nor suggests a biodegradable composition in which the “natural polymer portion consist[s] essentially of thermoplastic starch” of any type rather than “plant protein”, let alone thermoplastic starch that is “substantially free of high boiling liquid plasticizers”. In fact, the natural polymer portion in Zhang et al. consists mainly or entirely of plant protein. Because Warzelhan et al. also fails to teach or suggest anything with regard to thermoplastic starch, Applicants submit that claim 1 as amended is patentable over the combination of Zhang et al. and Warzelhan et al. for this reason alone.

Moreover, claim 1 further requires that the at least one soft synthetic thermoplastic biodegradable polymer comprises “an aliphatic-aromatic copolyester”. Polycaprolactone is clearly not an aliphatic-aromatic copolyester but is an aliphatic polyester comprising multiple caprolactone units condensed together to form a purely aliphatic chain. For this additional

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reason, Applicants submit that claim 1 is unobvious over the combination of Zhang et al. and Warzelhan et al.

Claim 20 was alternatively amended to recite that "at least one of the soft thermoplastic biodegradable polymer or the stiff thermoplastic biodegradable polymer comprises thermoplastic starch that is substantially free of glycerin". As discussed above, it is preferable when manufacturing a food wrap to omit high boiling liquid plasticizers such as glycerin which may diffuse into the food. Moreover, thermoplastic starch may either act as a "stiff" polymer or a "soft" polymer depending on its level of retained crystallinity. As clearly stated in the Application, "to the extent that starches become thermoplastic but retain a substantial portion of their crystallinity, such starches may act as "stiff", rather than "soft", polymers". Page 25, lines 12-14. The Application further teaches that "certain forms of starch in which the crystallinity has been greatly reduced or destroyed altogether can have very low glass transition temperatures and may, in fact, constitute "soft" biodegradable polymers within the scope of the invention". Page 30, lines 16-19.

As discussed above, Lorcks et al. discloses thermoplastic starch and synthetic polymer blends that include glycerin as a plasticizer for the thermoplastic starch. Tables 1-4, footnote 2. Because Warzelhan et al. teaches nothing with respect to thermoplastic starch, Applicants submit that claim 20 as amended is unobvious over the combination of Lorcks et al. and Warzelhan et al.

Zhang et al. neither teaches nor suggests anything with respect to thermoplastic starch of any kind, let alone that is "substantially free of glycerin". Because thermoplastic starch that is substantially free of glycerin is a positively recited element in claim 20, Applicants submit that claim 20 as amended is unobvious over the combination of Zhang et al. and Warzelhan et al.

Claim 23 has been amended to specifically recite that "the at least one stiff thermoplastic biodegradable polymer comprise[s] thermoplastic starch having sufficiently high crystallinity so as to be a stiff thermoplastic polymer, the thermoplastic starch being substantially free of high boiling liquid plasticizers". Support for thermoplastic starch having sufficiently high crystallinity so as to be a stiff thermoplastic polymer is disclosed in the Application at page 25, lines 12-14. As discussed above, none of Lorcks et al., Zhang et al., or Warzelhan et al. teach or suggest compositions that include thermoplastic starch that is "substantially free of high boiling

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liquid plasticizers" as recited in claim 23. Accordingly, Applicants submit that claim 23 is unobvious over the applied art.

Claim 25 was amended to state that "the at least one stiff thermoplastic biodegradable polymer optionally comprise[s] thermoplastic starch that is substantially free of glycerin" and that "the at least one soft thermoplastic biodegradable polymer comprise[s] an aliphatic-aromatic copolyester". As discussed above, the thermoplastic starch utilized in Lorcks et al. includes glycerin as a plasticizer. Tables 1-4, footnote 2. For at least this reason, claim 25 as amended is unobvious over the combination of Lorcks et al. and Warzelhan et al. Zhang et al. neither teaches or suggests the use of "an aliphatic-aromatic copolyester that is a soft thermoplastic biodegradable polymer". Polycaprolactone is not an aliphatic-aromatic copolyester but is an aliphatic polyester having repeating caprolactone units that are condensed together. Biomax, on the other hand, is not a "soft thermoplastic biodegradable polymer" that includes both aliphatic and aromatic units. That is because Biomax has a glass transition temperature that is far above 0°C. Accordingly, claim 25 as amended is believed to be unobvious over the combination of Zhang et al. and Warzelhan et al.

Finally, several dependent claims were amended in order to maintain agreement and/or clarity with regard to the independent claims.

In view of the foregoing, Applicants believe that the claims as amended are in allowable form. In the event the Examiner finds any remaining impediment to the prompt allowance of the claims which may be overcome by Examiner Amendment, the Examiner is respectfully requested to initiate a telephonic interview with the undersigned attorney.

Dated this 20<sup>th</sup> day of October 2005.

Respectfully submitted,



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